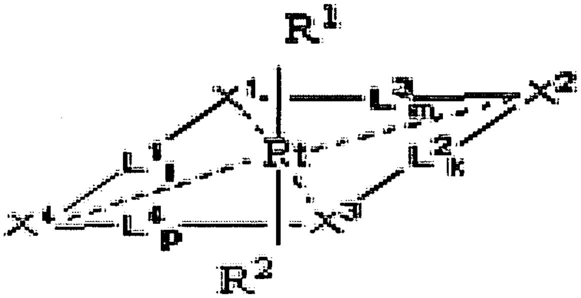
CLAIMS

What is claimed is:

1. A method of forming an intramolecular disulfide bond in a peptide, said method comprising:

contacting a peptide comprising at least two sulfhydryl (SH) groups with a compound having the formula:



wherein R^1 and R^2 are independently selected from the group consisting of Cl-, Br-, I-, OH-, and RCO_2- where R is an alkyl or substituted alkyl;

Pt is Pt(IV);

X^1, X^2, X^3, and X^4 are ligands independently selected from the group consisting of a nitrogen ligand, an oxygen ligand, a phosphorous ligand, and a sulfur ligand;

i, k, m, and p are independently 0 or 1;

L^1, L^2, L^3, and L^4 when present, are independently selected linkers.

2. The method of claim 1, wherein said ligand is a nitrogen ligand selected from the group consisting of cyanide, ammonia, and an amine nitrogen.

3. The method of claim 1, wherein X^1, X^2, X^3, and X^4 are the same.

4. The method of claim 1, wherein R^1 and R^2 are the same.

5. The method of claim 1, wherein L^1 and L^2 are the same.

6. The method of claim 1, wherein

i, k, m, and p are zero;

X^1, X^2, X^3, and X^4 are cyanide or ammonia.

7. The method of claim 6, wherein R^1 and R^2 are the same.

8. The method of claim 1, wherein
i and k are 1
m and p are 0; and
$L^1{}_i$ and $L^2{}_k$ are linkers selected from the group consisting of alkyl linkers, substituted alkyl linkers, and aromatic linkers.

9. The method of claim 8, wherein $L^1{}_i$ and $L^2{}_k$ are alkyl linkers comprising from 1 to 4 carbons.

10. The method of claim 9, wherein R^1 and R^2 are independently selected from the group consisting of Cl-, Br-, and I-.

11. The method of claim 9, wherein $-X^1-L^1i-X^4-$ and $-X^2-L^2{}_k-X^3-$ are both:
$-NH_2CH_2CH_2NH_2-$.

12. The The method of claim 1, wherein
i, k, m, and p are 1; and
$X^1-L^3-X^2-L^2-X^3-L^4-X^4-L^1$ is
$H_2NCH_2CH_2NHCH_2CH_2NHCH_2CH_2NH_2$.

13. The method of claim 1, wherein said peptide ranges in length from about 2 amino acids to about 60 amino acids.

14. The method of claim 1, wherein two amino acids that form a disulfide bond are adjacent amino acids.

15. The method of claim 1, wherein two amino acids that form a disulfide bond are separated by no more than about 58 amino acids.

16. The method of claim 11, wherein said peptide contains a methionine.

17. The method of claim 1, wherein said contacting is at a pH ranging from about pH 0 to about pH 9.

18. The method of claim 1, wherein said peptide is a chemically synthesized peptide.

19. The method of claim 1, wherein said peptide is a chemically synthesized peptide bearing a protecting group.

20. The method of claim 19, wherein said protecting group is an Fmoc or a tBoc.

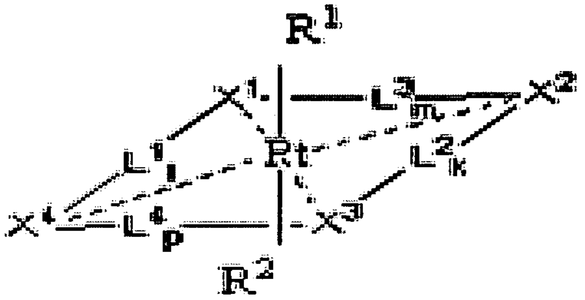
21. The method of claim 1, wherein said peptide is attached to a substrate.

22. The method of claim 1, wherein X^1, X^2, X^3, and X^4 are not cyanide.

23. A solution comprising:

a peptide comprising at least two sulfhydryl groups; and

a compound having the formula: :



wherein R^1 and R^2 are independently selected from the group consisting of Cl-, Br-, I-, OH-, and RCO_2- where R is an alkyl or substituted alkyl;

Pt is Pt(IV);

X^1, X^2, X^3, and X^4 are ligands independently selected from the group consisting of a nitrogen ligand, an oxygen ligand, a phosphorous ligand, and a sulfur ligand;

i, k, m, and p are independently 0 or 1;

L^1, L^2, L^3, and L^4 when present, are independently selected linkers.

24. The solution of claim 23, wherein said ligand is a nitrogen ligand selected from the group consisting of cyanide, ammonia, and an amine nitrogen.

25. The solution of claim 23, wherein X^1, X^2, X^3, and X^4 are the same.

26. The solution of claim 23, wherein R^1 and R^2 are the same.

27. The solution of claim 23, wherein L^1 and L^2 are the same.

28. The solution of claim 23, wherein
i, k, m, and p are zero;
X^1, X^2, X^3, and X^4 are cyanide or ammonia.

29. The solution of claim 28, wherein R^1 and R^2 are the same.

30. The solution of claim 23, wherein
i and k are 1;
m and p are zero; and
L^1 and L^2 are linkers selected from the group consisting of alkyl linkers, substituted alkyl linkers, and aromatic linkers.

31. The method of claim 30, wherein $L^1{}_i$ and $L^2{}_k$ are alkyl linkers comprising from 1 to 4 carbons.

32. The method of claim 31, wherein R^1 and R^2 are independently selected from the group consisting of Cl-, Br-, and I-.

33. The method of claim 31, wherein $-X^1-L^1i-X^4-$ and $-X^2-L^2{}_k-X^3-$ are both:
$-NH_2CH_2CH_2NH_2-$.

34. The The method of claim 1, wherein
i, k, m, and p are 1; and
$X^1-L^3-X^2-L^2-X^3-L^4-X^4-L^1$ is
$H_2NCH_2CH_2NHCH_2CH_2NHCH_2CH_2NH_2$.

35. The solution of claim 30, wherein L^1 and L^2 are alkyl linkers comprising from 1 to 4 carbons.

36. The solution of claim 35, wherein R^1 and R^2 are the same and are selected from the group consisting of Cl-, Br-, and I-.

37. The solution of claim 35, wherein $-X^1-L^1-X^4-$ and $-X^2-L^2-X^3-$ are both:
$-NH_2CH_2CH_2NH_2-$.

38. The solution of claim 23, wherein said peptide ranges in length from about 2 amino acids to about 100 amino acids.

39. The solution of claim 23, wherein two amino acids that form a disulfide bond are adjacent amino acids.

40. The solution of claim 23, wherein two amino acids that form a disulfide bond are separated by no more than 60 amino acids.

41. The solution of claim 23, wherein said peptide contains a methionine.

42. The solution of claim 23, wherein said solution has a pH ranging from about pH 1 to about pH 9.

43. The solution of claim 23, wherein said peptide is a chemically synthesized peptide.

44. The solution of claim 23, wherein said peptide is a chemically synthesized peptide bearing a protecting group.

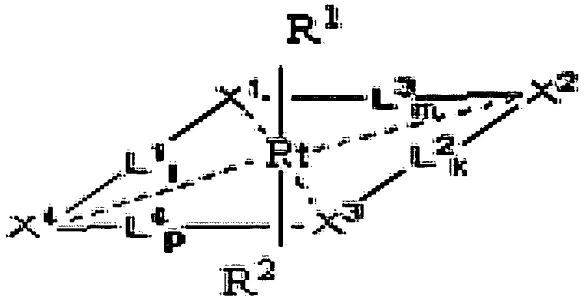
45. The solution of claim 23, wherein said protecting group is an Fmoc or a tBoc.

46. The solution of claim 23, wherein said peptide is attached to a substrate.

47. A peptide synthesizer for the synthesis of a peptide having an intramolecular disulfide linkage, said peptide synthesizer comprising:

a plurality of vials, said vials containing amino acids derivatized for chemical peptide synthesis wherein at least one of said vials comprises an amino acid that, when fully deprotected, bears a sulfhydryl (SH) group; and

a vial comprising a reagent having the formula:



wherein R^1 and R^2 are independently selected from the group consisting of Cl-, Br-, I-, OH-, and RCO_2- where R is an alkyl or substituted alkyl;

Pt is Pt(IV);

X^1, X^2, X^3, and X^4 are independently selected from the group consisting of a nitrogen ligand, an oxygen ligand, a phosphorous ligand, and a sulfur ligand;

i, k, m, and p are independently 0 or 1;

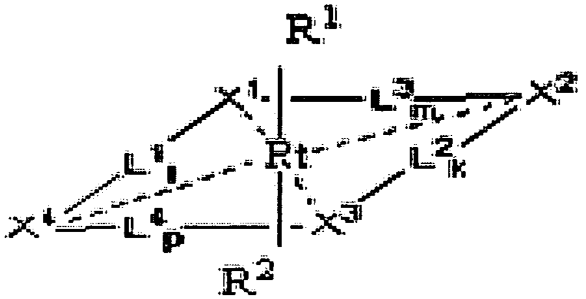
L^1, L^2, L^3, and L^4 when present, are independently selected linkers.

48. The peptide synthesizer of claim 47, wherein said nitrogen ligand is selected from the group consisting of cyanide, ammonia, and an amine nitrogen.

49. A method of chemically synthesizing a peptide comprising a disulfide linkage, said method comprising:

chemically coupling a plurality of amino acids to form a peptide comprising at least two sulfhydryl (SH) groups; and

contacting said peptide with a reagent having the formula:



wherein R^1 and R^2 are independently selected from the group consisting of Cl-, Br-, I-, OH-, and RCO_2- where R is an alkyl or substituted alkyl;

Pt is Pt(IV);

X^1, X^2, X^3, and X^4 are ligands independently selected from the group consisting of a nitrogen ligand, an oxygen ligand, a phosphorous ligand, and a sulfur ligand;

i, k, m, and p are independently 0 or 1;

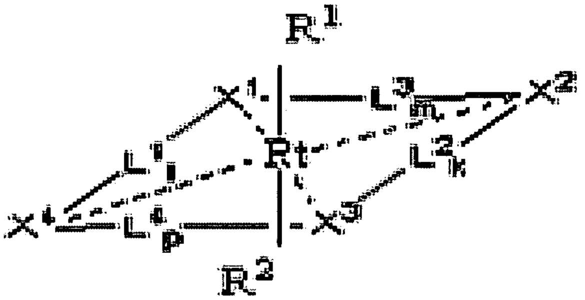
L^1, L^2, L^3, and L^4 when present, are independently selected linkers.

50. The method synthesizer of claim 49, wherein said ligand is a nitrogen ligand selected from the group consisting of cyanide, ammonia, and an amine nitrogen.

51. The method of claim 49, wherein said contacting is in a buffer having a pH ranging from about pH 1 to about pH 9.

52. A kit for forming an intramolecular disulfide bond in a peptide, said kit comprising:

a container containing a reagent having the formula:



wherein R^1 and R^2 are independently selected from the group consisting of Cl-, Br-, I-, OH-, and RCO_2- where R is an alkyl or substituted alkyl;

Pt is Pt(IV);

X^1, X^2, X^3, and X^4 are ligands independently selected from the group consisting of a nitrogen ligand, an oxygen ligand, a phosphorous ligand, and a sulfur ligand;

i, k, m, and p are independently 0 or 1;

L^1, L^2, L^3, and L^4 when present, are independently selected linkers.

53. The kit of claim 51, wherein said ligand is a nitrogen ligand selected from the group consisting of cyanide, ammonia, and an amine nitrogen.

54. The kit of claim 51, wherein said reagent is in a buffer at a pH ranging from about pH 1 to about pH 9.